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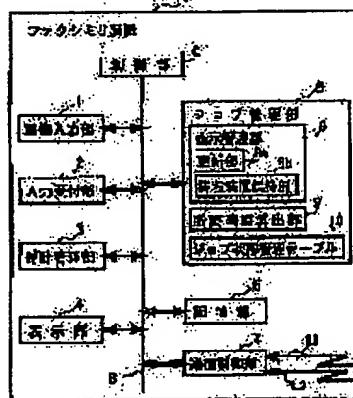
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(54) FACSIMILE EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To allow a user to easily judge the transmission of a job and to recognize the transmission lapse/result of the job by predicting and displaying the time of the transmission start or end of the already stored job or a job to be newly transmitted.

SOLUTION: A required time calculating part 9 calculates a required time for the transmission of picture information stored and held in a storing part 6 by using the number of transmission bytes and a communication line speed among attribute information. A job state such as a transmission processing order including priority order or whether or not the job is being transmitted or the job is waiting for being transmitted are managed by a job state management table 10. At the time of accepting the new job and accepting a displaying instruction from an inputting accepting part 2, a display managing part 8 of a job managing part 5 calculates the residual required time for the present transmission according to the transmission processing order managed by the job state management table 10, adds the required time of the already stored and held job, and displays predicted information such as the transmission starting time of the accepted job on a displaying part 4.



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(54) [Title of the Invention] FACSIMILE DEVICE

(57) [Abstract]

[Object] To estimate and display the time at which transmission of jobs that have already been stored or new outgoing jobs starts or ends, allowing a user readily to determine whether or not jobs should be transmitted and to recognize the progression/result of transmission.

[Solving Means] A time calculation unit 9 calculates the time required before completion of transmission of image information stored in a memory unit 6 by use of attribute information, which is the number of transmitted bytes and the communication line speed. In a job status management table 10, job status and the like are managed (e.g., the order in which jobs are transmitted is determined according to their priorities, and whether or not they are in process of transmission or waiting to be transmitted is determined). When a display management unit 8 of a job management unit 5 has received a new job and instructed by an input receiving unit 2 to display the information about the job, it then calculates the time required before completion of transmission of the job that is in process of transmission in accordance with the transmission process order managed by the job status management table 10, adds the time required before completion of transmission of the stored jobs to the time thus calculated, and displays, on a display unit 4, information about, for example, the time at which transmission of the received job will start.

[Scope of Claim]

[Claim 1] A facsimile device which estimates the time required before start of transmission of a new outgoing document or its transmission start time and which can display estimation results on a display unit, the facsimile device comprising:

calculation means for calculating the time required before completion of transmission of documents that are in process of transmission or waiting to be transmitted, on the basis of their attribute information

inputted at the time when they are instructed to be transmitted; and

display management means for adding the time required before completion of transmission of the documents waiting to be transmitted in the order in which they will be transmitted, and displaying, on the display unit, the resultant time as the time required before start of transmission of the new outgoing document.

[Claim 2] A facsimile device which estimates the time at which transmission of a new outgoing document starts and which can display estimation results on a display unit, the facsimile device comprising:

calculation means for calculating the time required before completion of transmission of documents that are in process of transmission or waiting to be transmitted, on the basis of their attribute information inputted at the time when they are instructed to be transmitted;

clock management means for managing the current time; and

display management means for acquiring the current time from the clock management means, adding the acquired current time to the time required before completion of transmission of the documents waiting to be transmitted in the order in which they will be transmitted, and displaying, on the display unit, the resultant time as the time required before start of transmission of the new outgoing document.

[Claim 3] The facsimile device according to Claim 2,

wherein the display management means adds, to the current time, the time required before completion of transmission of each of the new outgoing document and the documents that are in process of transmission or waiting to be transmitted in the order in which they will be transmitted, sets the addition result as the transmission completion time of each document and as the transmission start time of the next document, and displays, on the display unit, the transmission start time, the time required before completion of transmission and the transmission completion time for each document.

[Claim 4] The facsimile device according to any one of Claims 1 to 3, further comprising communication control means which is connected to a plurality of communication lines and performs a plurality of transmission/receipt processes at the same time by use of the plurality of communication lines,

wherein the display management means, in accordance with the transmission order, adds the time required before start of transmission of the next document to a communication line having the least time to which the time required has been added.

[Claim 5]

The facsimile device according to any one of Claims 1 to 4,

wherein the attribute information has a priority, the transmission order is the priority order indicated by the priority, and documents with the same priority are transmitted in the order in which they were received.

[Claim 6] The facsimile device according to any one of Claims 1 to 5,

wherein the attribute information has at least the number of transmitted bytes and the communication line speed, and

the time required before completion of transmission is obtained by dividing the number of transmitted bytes by the communication line speed.

[Claim 7] The facsimile device according to any one of Claims 1 to 6, further comprising instruction means for instructing to display on the display unit the time required before start of transmission of the new outgoing document or the transmission start time, the required time before completion of transmission and the transmission completion time for each document,

wherein, in a case where the instruction means has made an instruction, the display management unit displays, on the display unit, the time required before start of transmission of the new outgoing document or the transmission start time, the required time before completion of transmission and the transmission completion time for each document.

[Claim 8] The facsimile device according to Claim 7, further comprising update means for periodically updating displayed contents, which are based

on the instruction of the instruction means, along with the progress of transmission of the document that is in process of transmission and with the start of transmission of the documents waiting to be transmitted.

[Claim 9] The facsimile device according to any one of Claims 1 to 8,

wherein the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and

in a case where the judgment means has determined that it takes longer than the predetermined time, the display management device then displays, on the display unit, the alternative of either continuing or canceling the transmission of the new outgoing document, and when cancellation is inputted in the selection instruction means, storage of the new outgoing document is deleted.

[Claim 10] The facsimile device according to any one of Claims 1 to 8,

wherein the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and

in a case where the judgment means has determined that it takes longer than the predetermined time, the display management device then deletes storage of the new outgoing document.

[Claim 11] The facsimile device according to any one of Claims 1 to 8,

wherein the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and

in a case where the judgment means has determined that it takes longer than the predetermined time, the display management means displays, on the display unit, the time required before start of transmission

of the new outgoing document.

[Detailed Description of the Invention]

[0001]

[Technical Field to which the Invention belongs]

The present invention relates to a facsimile device which estimates the time required before start of transmission of a new outgoing document or its transmission start time, and can display estimation result on its display unit. More specifically, the present invention relates to a facsimile device capable of displaying the estimation result even when it already has outgoing documents waiting to be transmitted.

[0002]

[Prior Art]

Conventionally, facsimile devices with an image storage function temporarily store loaded image information in a memory, and then transmit the image information to the designated receiver through a communication line. Here, provided that all communication lines are busy, pieces of the image information stored in the memory are sequentially read out and transmitted at the time when any communication line becomes available. Accordingly, in these facsimile devices with an image storage function, users can monitor the status of a job being transmitted as well as those waiting to be transmitted, and the number of jobs waiting to be transmitted (including those in process of being transmitted) or the page count of the documents waiting to be transmitted is displayed on a display panel or the like, thus providing a rough understanding of the progression of transmission process.

[0003]

Meanwhile, in some facsimile devices, a display unit displays information about the job being transmitted during the transmission process.

[0004]

For example, Japanese Patent Laid-open No.Hei03-278669 discloses

a facsimile device in which image information to be transmitted is stored and the amount of the transmitted image information is monitored during the transmission process, and thereby the percentage of the image information that has been transmitted is displayed on the display unit on the basis of the two pieces of information.

[0005]

In addition, Japanese Patent Laid-open No.Hei02-104058 and Japanese Patent Laid-open No.Hei03-2557770 disclose a facsimile device that displays the time required before completion of transmission of a job being transmitted or its transmission completion time, by calculating the time required before completion of transmission on the basis of the attribute information of the job in question that has been instructed to be transmitted.

[0006]

Japanese Patent Laid-open No.Hei05-114991 discloses a facsimile device that has a data table indicating time required to transmit one piece of document, and that displays, on the basis of the data table and the number of documents to be transmitted, the total time required before completion of transmission of the documents to be transmitted, as well as the remaining time before completion of transmission of the documents in the course of the transmission process.

[0007]

[Problems to be Solved by the Invention]

The forgoing conventional facsimile devices, however, only display the status of the job being transmitted. They are not configured to estimate the transmission start time and transmission completion time of jobs which has already been stored and waiting to be transmitted (including those in process of transmission) as well as the total time required before completion of all jobs, and to display the estimation results.

[0008]

For this reason, when jobs which a user have been instructed for transmission are already stored, the user cannot estimate the time at which the transmission of the stored documents starts or ends, and thus to check the status of the jobs instructed to be transmitted, the user takes the trouble of showing up at the facsimile device for many times.

[0009]

Moreover, when a user instructs transmission of a new outgoing document, the user cannot estimate the time at which transmission of the new outgoing document starts (i.e., how long it will take before start of transmission from the current time). For this reason, the user cannot determine whether or not the new outgoing document should be transmitted using this facsimile device.

[0010]

In this connection, it is an object of the present invention to eliminate the foregoing problems and thus to provide a facsimile device capable of estimating the time at which the transmission of already-stored jobs or a new outgoing job starts or ends, displaying the estimation results, and allowing a user to readily determine whether or not jobs should be transmitted and to be informed of the progression/result of transmission.

[0011]

[Means for solving the Problems]

The first invention is a facsimile device which estimates the time taken before start of transmission of a new outgoing document or its transmission start time and which can display the estimation results on a display unit, the facsimile device characterized by including: calculation means for calculating the time required before completion of transmission of documents that are in process of transmission or waiting to be transmitted, on the basis of their attribute information inputted at the time when they are instructed to be transmitted; and display management means for adding the time required before completion of transmission of the documents

waiting to be transmitted in the order in which they will be transmitted, and displaying, on the display unit, the resultant time as the time required before start of transmission of the new outgoing document.

[0012]

The second invention is a facsimile device which estimates the time at which transmission of a new outgoing document starts and which can display the estimation results on a display unit, the facsimile device characterized by including: calculation means for calculating the time required before completion of transmission of documents that are in process of transmission or waiting to be transmitted, on the basis of their attribute information inputted at the time when they are instructed to be transmitted; clock management means for managing the current time; and display management means for acquiring the current time from the clock management means, adding the acquired current time to the time required before completion of transmission of the documents waiting to be transmitted in the order in which they will be transmitted, and displaying, on the display unit, the resultant time as the time required before start of transmission of the new outgoing document.

[0013]

The third invention is characterized in that in the second invention, the display management means adds to the current time the time required before completion of transmission of each of the new outgoing document and the documents that are in process of transmission or waiting to be transmitted in the order in which they will be transmitted, sets the addition result as the transmission completion time of each document and as the transmission start time of the next document, and displays on the display unit the transmission start time, the time required before completion of transmission and the transmission completion time for each document.

[0014]

The forth invention is characterized in that in any one of the first to

third inventions, the facsimile device further comprises communication control means which is connected to a plurality of communication lines and performs a plurality of transmission/receipt processes at the same time by use of the plurality of communication lines, wherein the display management means, in accordance with the transmission order, adds the time required before start of transmission of the next document to a communication line having the least time to which the time required has been added.

[0015]

The fifth invention is characterized in that in any one of the first to forth inventions the attribute information has a priority, that the transmission order is the priority order indicated by the priority, and that documents with the same priority are transmitted in the order in which they were received.

[0016]

The sixth invention is characterized in that in any one of the first to fifth inventions, the attribute information has at least the number of transmitted bytes and the communication line speed, and that the time required before completion of transmission is obtained by dividing the number of transmitted bytes by the communication line speed.

[0017]

The seventh invention is characterized in that in any one of the first to sixth inventions, the facsimile device further comprises instruction means for instructing to display, on the display unit, the time required before start of transmission of the new outgoing document or the transmission start time, the required time before completion of transmission and the transmission completion time for each document, wherein, in a case where the instruction means has made an instruction, the display management unit displays, on the display unit, the time required before start of transmission of the new outgoing document or the transmission start time,

the required time before completion of transmission and the transmission completion time for each document.

[0018]

The eighth invention is characterized in that in any one of the first to seventh inventions, the facsimile device further comprises update means for periodically updating displayed contents, which are based on the instruction of the instruction means, along with the progress of transmission of the document that is in process of transmission and with the start of transmission of the documents waiting to be transmitted.

[0019]

The ninth invention is characterized in that in any one of the first to eighth inventions, the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and in a case where the judgment means has determined that it takes longer than the predetermined time, the display management means then displays, on the display unit, the alternative of either continuing or canceling the transmission of the new outgoing document, and when cancellation is inputted in the selection instruction means, storage of the new outgoing document is deleted.

[0020]

The tenth invention is characterized in that in any one of the first to eighth inventions, the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and in a case where the judgment means has determined that it takes longer than the predetermined time, the display management means then deletes storage of the new outgoing document.

[0021]

The eleventh invention is characterized in that in any one of the first

to eighth inventions, the display management means comprises judgment means for determining whether or not the time required before start of transmission of the new outgoing document is longer than a predetermined time, and in a case where the judgment means has determined that it takes longer than the predetermined time, the display management means displays, on the display unit, the time required before start of transmission of the new outgoing document.

[0022]

[Embodiment Mode for carrying out the Invention]

Hereinafter, embodiments of the present invention will be described with reference to the drawings.

[0023]

Fig. 1 shows the configuration of a facsimile device of a first embodiment of the present invention. In this drawing, a facsimile device F is connected to a network N, and can make a facsimile communication with another unillustrated facsimile device connected to the network N. The facsimile device F is connected to the network N via communication lines L1 and L2. Although the facsimile F may be connected to the network N only via the communication line L1, it is connected to the network N via the two physical lines L1 and L2. Even though the facsimile device F physically has one communication line, it, of course, may be configured to have a plurality of communication lines with a multiplexing technique.

[0024]

The facsimile device F is realized by an image input unit 1 for scanning image information of a document, a key panel, an LCD and the like. Further, the facsimile device F is realized by an input receiving unit 2 for receiving user's instructions, a clock management unit 3 for managing the current time, an LCD and the like. The facsimile device F includes: a display unit 4 for displaying a variety of information; a job management unit 5 for managing a variety of job statuses; a memory unit 6 for storing

image information scanned by the image input unit 1 and attribute information of the image information; a communication control unit 7 for performing a transmission/receipt process with the network N; a control unit C for controlling the whole of the device; and a bus B for connecting the foregoing units together.

[0025]

The job management unit 5 includes: a display management unit 8 for displaying, on the display unit 4, the job status managed by the job management unit 5, especially, estimated time such as transmission start time, the time required before completion of transmission, and transmission completion time; a time calculation unit 9 for calculating on the basis of the attribute information of jobs stored in the memory unit 6, the time required to transmit them; and a job status management table 10 for managing the statuses of jobs and the order in which they will be transmitted, and the like.

[0026]

The display management unit 8 includes a update unit 8a and a waiting time retention unit 8b. The update unit 8a updates, along with progress of transmission of the job that is in process of transmission and with receipt of new jobs, information displayed on the display unit 4, such as estimated time of completion of transmission or its estimated time required before completion of transmission, at a predetermined moment. The waiting time retention unit 8b retains waiting time for each of the communication lines L1 and L2.

[0027]

Under the control of the control unit C, the facsimile device F temporarily stores, into the memory unit 6, the image information inputted from the image input unit 1 and the attribute information, which is the information inputted from the input receiving unit 2 and obtained along with input of information from the image input unit 1.

[0028]

The job management unit 5 manages transmission/receipt of the statuses of jobs stored in the memory unit 6 (including those in process of transmission) with the job status table 10. With this job status table 10, jobs are managed in which they will undergo a transmission/receipt process. They are managed according to the following factors: document identifier (ID) that is unique to each job; job status indicating whether a job is in process of transmission or waiting to be transmitted; the page count of the transmitted document; the number of bytes of the transmitted information; and the in-use communication line number.

[0029]

Fig. 2 shows how image information and its attribute information are stored in the memory unit 6. In each job, image information and its attribute information are associated with each other.

[0030]

Attribute information to be stored is the information that is detected or set at the time when image information is scanned. Examples of attribute information includes document ID set by the job management unit 5, address number, address, communication mode such as the type of communication protocol, communication line speed and error correction function, page count of a document, the number of bytes of image information, the time when a job was received, the time required to complete transmission, and priority of a job. Here, only the time required before completion of transmission is stored in the memory unit 6, and then information calculated by the time calculation unit 9 of the job management unit 5 is stored therein. In other words, the time required before completion of transmission is the secondary treatment information obtained using other attribute information, which is the value obtained by dividing the number of bytes of the image information by the communication line speed (byte/min) in the communication mode.

[0031]

Here, a procedure in which information, such as the estimated time at which transmission of each job starts, is displayed will be described with reference to the flowchart shown in Fig. 3.

[0032]

In Fig. 3, an instruction for displaying the job status is first inputted through the input receiving unit 2 (Step 101). The display management unit 8 of the job management unit 5 then clears contents retained in the waiting time retention unit 8b for each of the communication lines L1 and L2 (Step 102).

[0033]

Subsequently, the job management unit 5 determines the presence of a job that is in process of transmission (Step 103), and if it is determined that such a job is present, it then calculates the time required before completion of transmission of the job as well as its transmission completion time. To be more specific, the job management unit 5 first acquires the number of the transmitted bytes of the job that is in process of transmission and the in-use communication line number from the job status management table 10, and then acquires the communication line speed from the attribute information (Step 104). Moreover, the job management unit 5 acquires, from the attribute information, the number of bytes of the image information of the job that is in process of transmission, i.e., the total number of the transmitted bytes of that job (Step 105), and then acquires the current time from the clock management unit 3 (Step 106). Subsequently, the time calculation unit calculates the remaining time required before completion of transmission of that job, and the display management unit 8 calculates, on the basis of the remaining time, the transmission completion time of that job (Step 107). The display management unit 8 then displays the calculated the time required before completion of transmission and its transmission completion time on the

display unit 4 (Step 108). Here, the calculation of the time required before completion of transmission in Step 107 is performed as follows: the number of bytes acquired in Step 105 is subtracted from the number of transmitted bytes acquired in Step 104 to calculate the number of bytes that have not yet been transmitted, and this number is divided by the communication line speed (byte/min) acquired in Step 104. Then, the time required before completion of transmission thus calculated is written in a communication line that corresponds to the in-use communication line number retained in the waiting time retention unit 8a (Step 109).

[0034]

Furthermore, the job management unit 5 determines the presence of jobs waiting to be transmitted, based on the job status managed by the job status management table 10 (Step 110). If it is determined that such jobs are present, it then calculates and repeats the process to display the time required before completion of transmission and its transmission completion time for each job in accordance with the transmission process order managed by the status management table 10. To be more specific, the job management unit 5 makes reference to the contents of the waiting time retention unit 8b, acquires the number of the communication line having the least waiting time in the communication lines (Step 111), and then acquires the waiting time for the communication line corresponding to the this number (Step 112). The job management unit 5 then determines whether or not the current time has already been acquired (Step 113), and acquires the current time from the clock management unit 3 only when it is determined that the current time has not been acquired (Step 114). The display management unit 8 then displays, on display unit 4, the transmission start time of a job waiting to be transmitted (Step 115). If there is a job that is in process of transmission, the transmission start time is the transmission completion time of that job that is in process of transmission. If there is no such a job, the transmission start time is the

current time acquired from the clock management unit 3. The display management unit 8 then acquires the time required before completion of transmission of the job waiting to be transmitted, based on the document ID (Step 116), and the time required before transmission of that job waiting to be transmitted is displayed on the display unit (Step 117). The display management unit 8 then calculates the transmission completion time of the job waiting to be transmitted, based on the time required before completion of transmission thus acquired (Step 118). In other words, the display management unit 8 adds the time required for transmission, which has been acquired in Step 116, to the transmission start time acquired in Step 115 to calculate the transmission completion time. The transmission completion time thus calculated is displayed on the display unit 4 (Step 119). Subsequently, the time required before completion of transmission, which has been acquired in Step 116 is added to the waiting time for the communication line corresponding to the in-use communication line number acquired in Step 111, which is retained in the waiting time retention unit 8b (Step 120). The processing then proceeds to Step 110. In accordance with the transmission order managed by the job status management table 10, this processing is repeated for jobs waiting to be transmitted, until it is determined in Step 110 that no job is waiting to be transmitted. If it is determined that such jobs are no longer present, this processing ends.

[0035]

Specifically, if it is determined in Step 103 that no job is in process of transmission, the processing then proceeds to Step 110, and if it is determined in Step 110 that no job is waiting to be transmitted, the processing then ends.

[0036]

Note that if it is determined that in Step 103, no job is in process of transmission and that in Step 110, no job is waiting to be transmitted, the display unit 4 may display for instance that the transmission waiting time

is "0" or jobs can be immediately transmitted.

[0037]

Accordingly, since instructions for displaying the job status are inputted through the input receiving unit 2, it is possible to estimate and display the transmission start time, the time required before completion of transmission, the transmission completion time and the like for jobs, even in the presence of a job that is in process of transmission as well as jobs waiting to be transmitted.

[0038]

Note that the update unit 8a updates the contents displayed on the display unit 4 as needed basis at the moment when a process for a job starts or ends, at the moment when a new job is received, or at a constant predetermined moment.

[0039]

Here, if priority is retained as attribute information, the job management unit 5 changes, on the basis of this priority, the order in which jobs are transmitted, which is managed by the job management table 10.

[0040]

Specifically, Fig. 4 shows an example in which the transmission process order managed by the job management table 10 is changed according to priority. In Fig. 4, as an initial state, two jobs are stored in the memory unit 6: one with a document ID "#1", and the other with a document ID "#2". In the job management table 10, the job status of the two jobs is managed. Here, the job with the document ID "#1" was received ahead of the job with the document ID "#2", and has a priority of "High", which is higher than "Medium", the priority of the job with the document ID "#2". For this reason, the job management table 10 transmits the two jobs in the order in which they were received. In addition, it can be learned from the job status shown in the job management table 10 that the job with the document ID "#1" is in process of transmission and that the job with the

document ID "#2" is waiting to be transmitted. Further, the job status of the job with the document ID "#1" reveals that, out of the 2 pages of the document, transmission of one page has been completed in the course of the transmission process, and that the number of transmitted bytes is 512 bytes.

[0041]

Upon receipt of a new job with a document ID "#3" and a priority of "High" in this state, the job management unit 5 sorts the jobs to be transmitted in the order of descending priorities. To be more specific, the job with the document ID "#3" has a priority of "High" and the job with the document ID "#2", which has been received ahead of the job in question, has a priority of "Medium". For this reason, they are sorted in such a way that the job with the document ID "#3" is first transmitted. However, the job with the document ID "#1" has a priority of "High", as is the job with the document ID "#3". Accordingly, the job with the document ID "#1" and the job with the document ID "#3" are transmitted in the order they were received. Thus, although the order in which they were received is: document ID "#1"→document ID "#2"→document ID "#3", priorities of the jobs are taken into consideration and thus the order in which they are transmitted will be: document ID "#1"→document ID "#3"→document ID "#2". Note that when the job status indicates, "transmitting", the order in which the job in process of transmission is processed, of course, never changes even when a newly received job has a higher priority than this job.

[0042]

Since priority is added as attribute information as described above, jobs are transmitted according to priority, and therefore, the estimated time of completion of transmission of jobs and the like are displayed on the display unit 4, with their priorities taken into consideration.

[0043]

Of course, in a facsimile device which cannot set priority as attribute

information, jobs are transmitted in the order in which they were received.

[0044]

Here, Fig. 5 shows a display example of jobs that correspond to the jobs shown in Fig. 4, which respectively have the document IDs "#1", "#2" and "#3" and where their priorities are taken into consideration. In Fig. 5, jobs are displayed in the following order: document ID "#1"(address "A")→document ID "#3"(address "C")→document ID "#2"(address "B"), which is the same as the transmission process order changed by the job status management table 10 shown in Fig. 4. The transmission completion times of the jobs with the document IDs "#1" and "#3" are the transmission start times of the jobs with the document IDs "#3" and "#2" respectively. Moreover, the displayed contents allows a user to acquire estimated times, i.e., allowing a user to know that transmission of all jobs will be completed at 14:35, and that transmission of the stored jobs (e.g., the job with the document ID "#3"(address C)) will start at 10:32 and will be completed at 10:34, thereby eliminating the need of taking the trouble of showing up at the facsimile device for many times for the confirmation of the processing result of a job that has once been instructed to be transmitted.

[0045]

Note that the displayed contents shown in Fig. 5 also include necessary information such as communication status, communication mode, page count and the like, for each job. In addition, the sentence "Communication Status" is displayed which indicates that the displayed content is the information about the progress of transmission of jobs, and the amount of free memory of the memory unit 6 of the facsimile device F is also displayed in percentage. Other information may, of course, be displayed; priority may be displayed for each job.

[0046]

Next, a second embodiment of the present invention will be described.

[0047]

In the first embodiment, the estimated transmission start time and the like for jobs are displayed on the display unit. In the second embodiment, predetermined communication restriction is actively conducted and a warning is delivered along this restriction, based on the estimated times thus obtained.

[0048]

Fig. 6 shows the configuration of a facsimile device of the second embodiment of the present invention. The facsimile device F2 differs from the configuration of the first embodiment shown in Fig. 1 in that it has a judgment unit 8c inside the display management unit 8 of the job management unit 5, and other components are similar to those shown in Fig. 1.

[0049]

The judgment unit 8c determines whether or not receipt of a new job has extended the time required before completion of transmission of all jobs to longer than the pre-set allowable waiting time.

[0050]

The display management unit 8 restricts communications and delivers a warning on the basis of the determination of the judgment unit 8c.

[0051]

Here, with reference to the flowchart shown in Fig. 7, the process in which communication restriction and display of a warning along with this restriction are conducted by the facsimile device F2 will be described.

[0052]

In Fig. 7, the job management unit 5 of the facsimile device F2 first conducts a similar process as that of the facsimile device F1 shown in Fig. 3; it conducts Steps 101-120 except for processes associated with calculation and display of the time required before completion of transmission of all

jobs.

[0053]

Specifically, an instruction for transmitting outgoing jobs is first received through the input receiving unit 2 (Step 201). The display management unit 8 of the job management unit 5 then clears contents retained in the waiting time retention unit 8b (Step 202).

[0054]

The job management unit 5 then determines the presence of a job that is in process of transmission (Step 203), and if it is determined that such a job is present, it then calculates the time required before completion of transmission of that job. In other words, the job management unit 5 first acquires, from the job status management table 10, the number of transmitted bytes of that job and the in-use communication line numbers, as well as the communication line speed from the attribute information (Step 204). Furthermore, the job management unit 5 acquires the number of bytes of the image information of that job (Step 205), and divides the acquired number of bytes by the communication line speed to calculate the time required for before completion of transmission of that job (Step 206). Then, the time required for transmission thus calculated is written in a communication line that corresponds to the in-use communication line number retained in the waiting time retention unit 8a (Step 207).

[0055]

Furthermore, the job management unit 5 determines the presence of jobs waiting to be transmitted, based on the job status managed by the job status management table 10 (Step 208). If it is determined that such jobs are present, it then repeats to calculate the time required before completion of transmission of each job in accordance with the transmission process order managed by the status management table 10. To be more specific, the job management unit 5 makes reference to the contents of the waiting time retention unit 8b, acquires the number of the communication line

having the least waiting time in the communication lines (Step 209), and then acquires the waiting time for the communication line corresponding to the number (Step 210). Subsequently, the display management unit 8 acquires the time required before start of transmission of the job waiting to be transmitted, based on the document ID (Step 211), and adds the acquired waiting time to the corresponded waiting time of the communication lines in the waiting time retention unit 8b (Step 212). The processing then proceeds to Step 208 to repeat the foregoing Steps 209-212 for jobs waiting to be transmitted. Thus, in presence of jobs that are in process of transmission or stored, the time required before completion of transmission of these jobs is added.

[0056]

Next, if it is determined in Step 208 that no job is waiting to be transmitted, the number of the communication line having the least waiting time in the communication lines is acquired (Step 213), and then the waiting time for the communication line corresponding to the communication line number is acquired (Step 214). The judgment unit 8c then acquires the pre-set allowable waiting time (Step 215) and determines whether or not the waiting time acquired in Step 214 is longer than the pre-set allowable waiting time (Step 216). If it is determined that the acquired waiting time is not longer than the pre-set allowable waiting time, the processing ends. Then, the process of transmitting received jobs is continued. Meanwhile, if it is determined that the acquired waiting time is longer than the pre-set allowable waiting time, predetermined communication restriction is conducted and thus a warning is delivered along with this restriction (Step 217), and the processing ends.

[0057]

With reference to display examples of warning shown in Figs. 8 to 10, the specific process of the communication restriction and the delivery of a warning along with this restriction will be described.

[0058]

Fig. 8 shows a display example of warning, in which a user's judgment is requested in order to process the received jobs in accordance with this judgment. Upon receipt of a new job, if the waiting time of the facsimile device F2 is longer than the pre-set allowable time, the display management unit 8 delivers a warning as shown Fig. 8. That is, the display management unit 8 displays the following warning sentence: "All lines are busy now. The time required before initiation of communication exceeds the pre-set allowable waiting time", and requests the user to decide whether or not to continue transmission of the received job. On this display, the button B1 for instructing continuation of transmission and the button B2 for instructing cancellation are both displayed as GUI. The user selects one of these buttons B1 and B2 and thus the corresponding processing is conducted. For example, if the button B1 for instructing continuation of transmission is selected, the received job is stored as it is, and is transmitted after a certain period of time under management of the job management unit 5. Meanwhile, if the button B2 for instructing cancellation is selected, the received job is deleted from the memory unit 6, treated as though it never existed and managed by the job management unit 5.

[0059]

With this warning display where a user is allowed to have a choice, the user is surely informed that it takes more than the pre-set allowable waiting time for start of transmission of outgoing job and that it will be long before the job is transmitted. Thus the user can have alternatives for this situation, and can take a flexible approach.

[0060]

By contrast, Fig. 9 shows a display example of warning, in which a user's judgment is not requested to process the received job. In this case, if the time required, before the facsimile device F2 becomes available, exceeds

the pre-set allowable waiting time upon receipt of a new job, the warning sentence "All lines are busy now. The time required before initiation of communication exceeds the pre-set allowable waiting time" is displayed, as well as the sentence "No job is acceptable". Thus, the user is warned that new jobs are not acceptable. The user is then requested to select the button B3 for instructing, "Close". When this button is selected, the job management unit 5 actually cancels the management of the outgoing job, and forcibly deletes the job stored in the memory unit 6.

[0061]

Thus, the user is surely informed that outgoing jobs will not be transmitted within the pre-set allowable waiting time.

[0062]

Fig. 10 shows a display example for showing the time required before start of transmission of the received job is displayed in a case where the waiting time is longer than the pre-set allowable time. Specifically, when the waiting time of a newly received job is longer than the pre-set allowable waiting time, the display management unit 8 informs the user that transmission of this job will start after the waiting time. In the display shown in Fig. 10, the sentence "Transmission of the received job will start in 2 minutes and 30 seconds" is displayed, and the user is informed of the time taken before start of transmission of received jobs.

[0063]

Thus, the user can recognize that outgoing jobs will be transmitted within the pre-set allowable waiting time if the warning shown in Fig. 10 is not displayed, and is surely informed that the jobs will be transmitted within the displayed waiting time when the warning is displayed.

[0064]

Note that the waiting time shown in Fig. 10 may be updated as needed by the update unit 8a. Further, if it is determined that an outgoing job will be transmitted within the allowable waiting time during the period

where no selection or confirmation (e.g., selection of close button) is made for the warnings shown in Figs. 8 to 10, the display of these warnings may be cancelled.

[0065]

[Effect of the Invention]

As described in detail before, the present invention has the following effect: even when a facsimile device has a document being transmitted and outgoing documents waiting to be transmitted, the transmission start time, the time required before start of transmission, the transmission completion time and the like for the outgoing jobs are estimated and displayed. Thus, users do not have to take the trouble of showing up at the facsimile device for many times to confirm whether or not new outgoing documents have been transmitted, and therefore, it is possible to reduce burdens on them.

[0066]

In addition, since it is possible to estimate and display the transmission start time, the time required before start of transmission, the transmission completion time and the like for the already-received documents, the present invention provides a following effect: user's burden is reduced, they do not have to confirm whether or not the document has been transmitted.

[0067]

Furthermore, when the facsimile device has a plurality of communication lines, a communication line having the least waiting time in the communication lines is selected, and the transmission start time is estimated. For this reason, the present invention provides a following effect: estimation time of completion of transmission and estimated time required before completion of transmission become more accurate.

[0068]

Moreover, the transmission process is managed with priority taken into consideration, and the display processing is performed under this

management. For this reason, the present invention provides a following effect: when a document that has a higher priority but has been received late is instructed to be transmitted, it is possible to appropriately estimate, for example, the time at which transmission of the outgoing document will start.

[0069]

Furthermore, the judgment means determines whether or not the time required before start of transmission is longer than a predetermined period of time, restricts communications and delivers a warning display along the restriction on the basis of the determination. Thus, the present invention provides a following effect: users can readily make judgments, and thus it is possible to prevent them from instructing transmission of documents without knowing that it takes a longer time than expected before start of transmission of the documents.

[Brief Description of the Drawings]

Fig. 1 shows the configuration of a facsimile device of a first embodiment of the present invention.

Fig. 2 shows how image information and its attribute information are stored in a memory unit 6.

Fig. 3 is a flowchart showing the process of displaying information concerning, for example, the estimated time at which transmission of jobs starts.

Fig. 4 shows an example of a job status management table 10, in which the transmission process order is changed and in which priority is taken into consideration.

Fig. 5 shows a display example of the information concerning, for example, estimated times in the first embodiment.

Fig. 6 shows the configuration of a facsimile device of a second embodiment of the present invention.

Fig. 7 is a flowchart showing the process of communication

restriction and display of warnings associated with this restriction in the second embodiment.

Fig. 8 shows a display example for requesting a user's judgment with respect to transmission of jobs, in a case where the waiting time is longer than the allowable waiting time.

Fig. 9 shows a display example for warning a user that transmission of jobs is rejected, in a case where the waiting time is longer than the allowable waiting time.

Fig. 10 shows a display example of warning for displaying the time required before start of transmission of jobs, in a case where the waiting time is longer than the allowable waiting time.

[Description of Symbols]

F...Facsimile device 1...Image input unit 2...Input receiving unit
3...Clock management unit 4...Display unit 5...Job management unit
6...Memory unit 7...Communication control unit 8...Update unit
8b...Waiting time retention unit 8c...Judgment unit 9...Time calculation unit
10...Job status management table C...Control unit L1,
L2...Communication line N...Network B...Bus

Fig.1

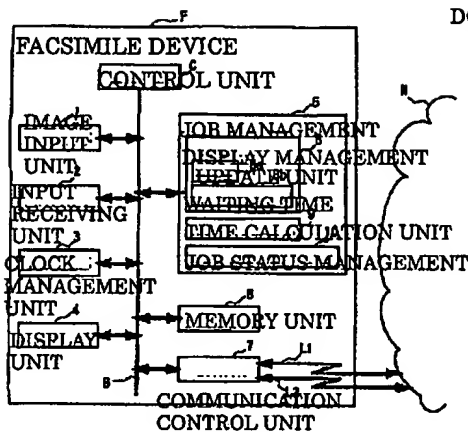


Fig.2

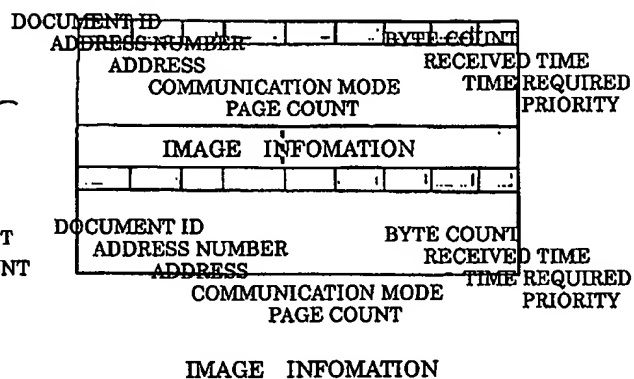


Fig.5

COMMUNICATION STATUS				FREE MEMORY		
ADDRESS	COMMUNICATION STATUS	COMMUNICATION MODE	PAGE COUNT	TRANSMISSION START TIME	TRANSMISSION TIME REQUIRED	TRANSMISSION COMPLETION TIME
A		G3	1/2	10:30	1'20"	10:32
C		G3	2	10:32	2'40"	10:34
B		G3	2	10:34	0'40"	10:35

Fig.8

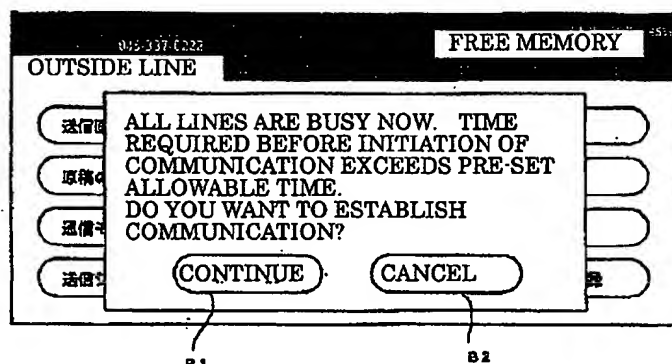


Fig.3

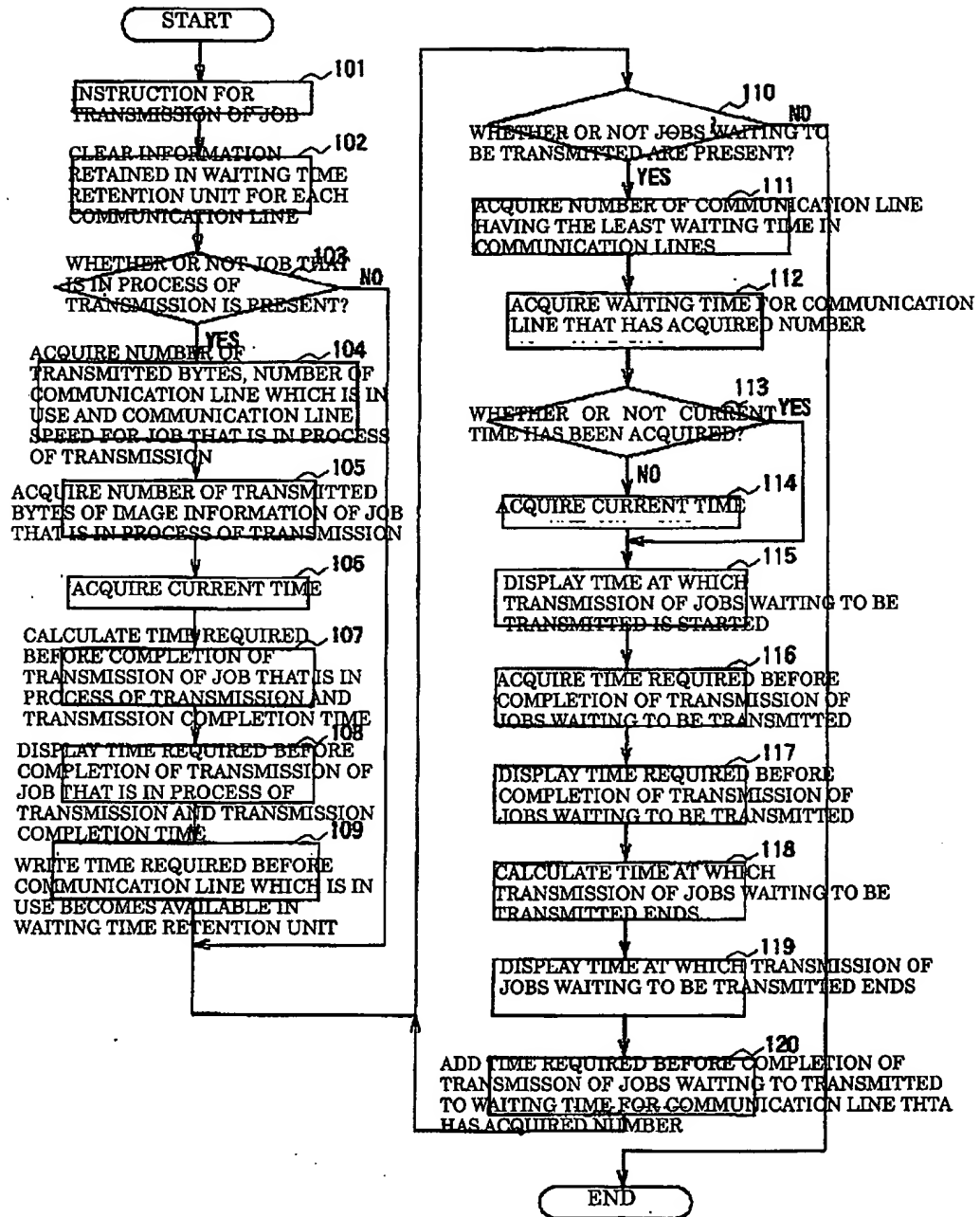


Fig.4

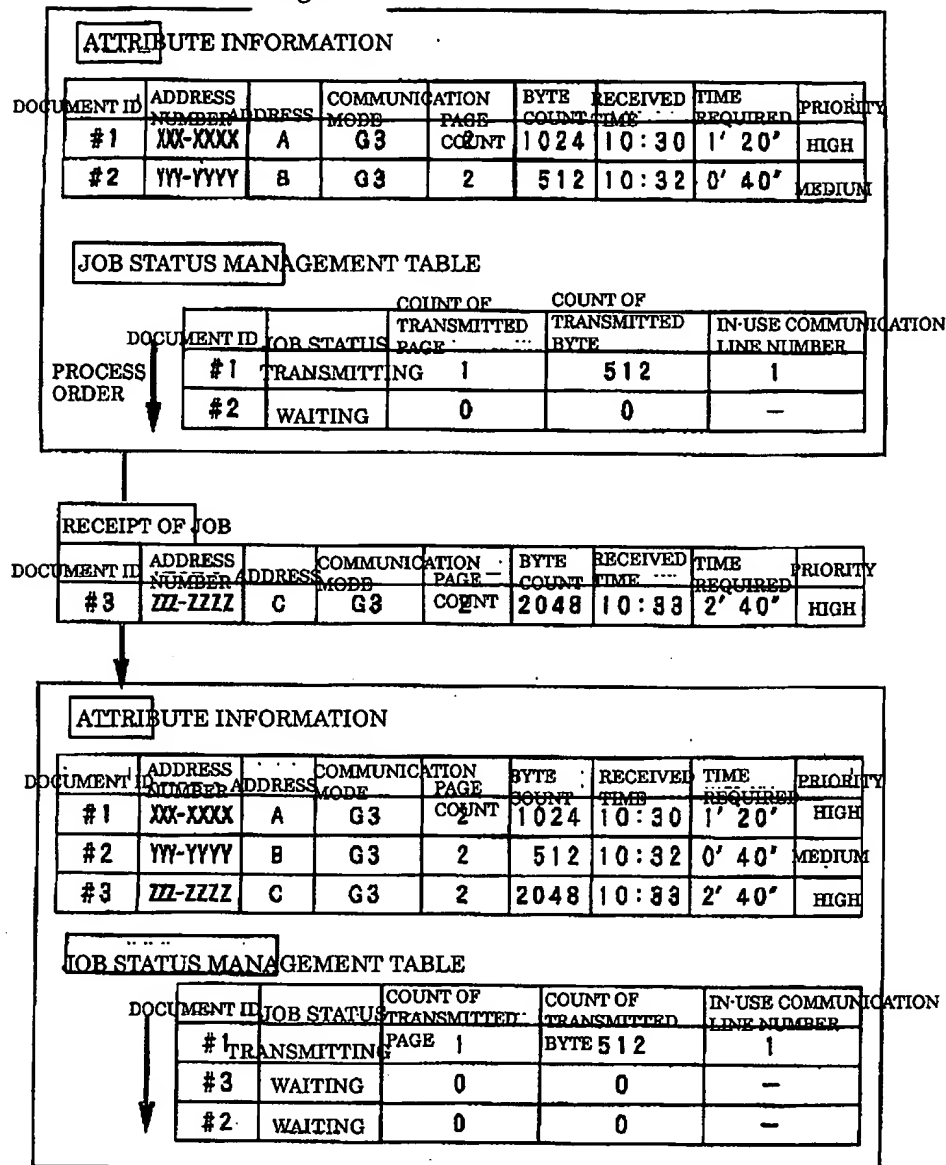


Fig.6

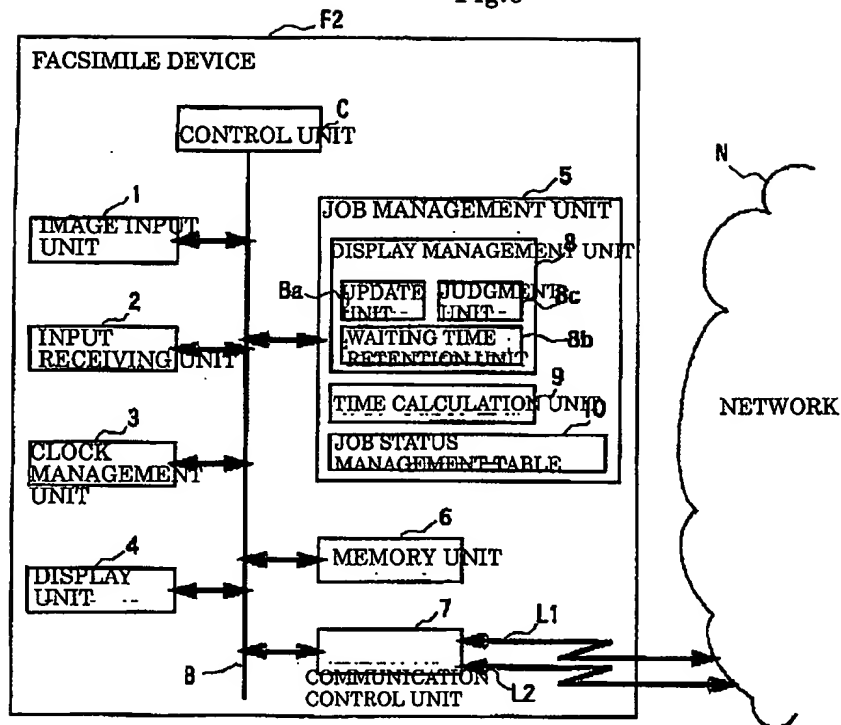
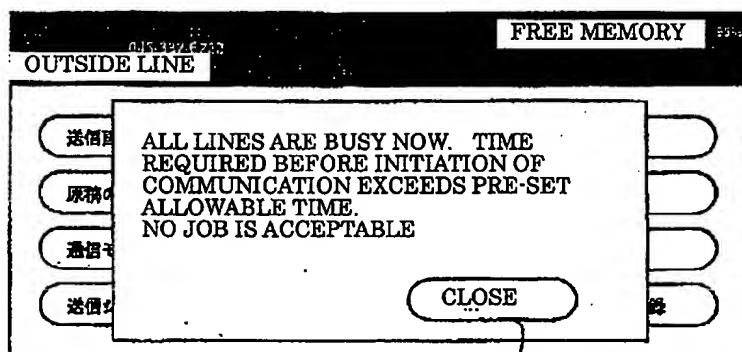


Fig.9



B3

Fig.7

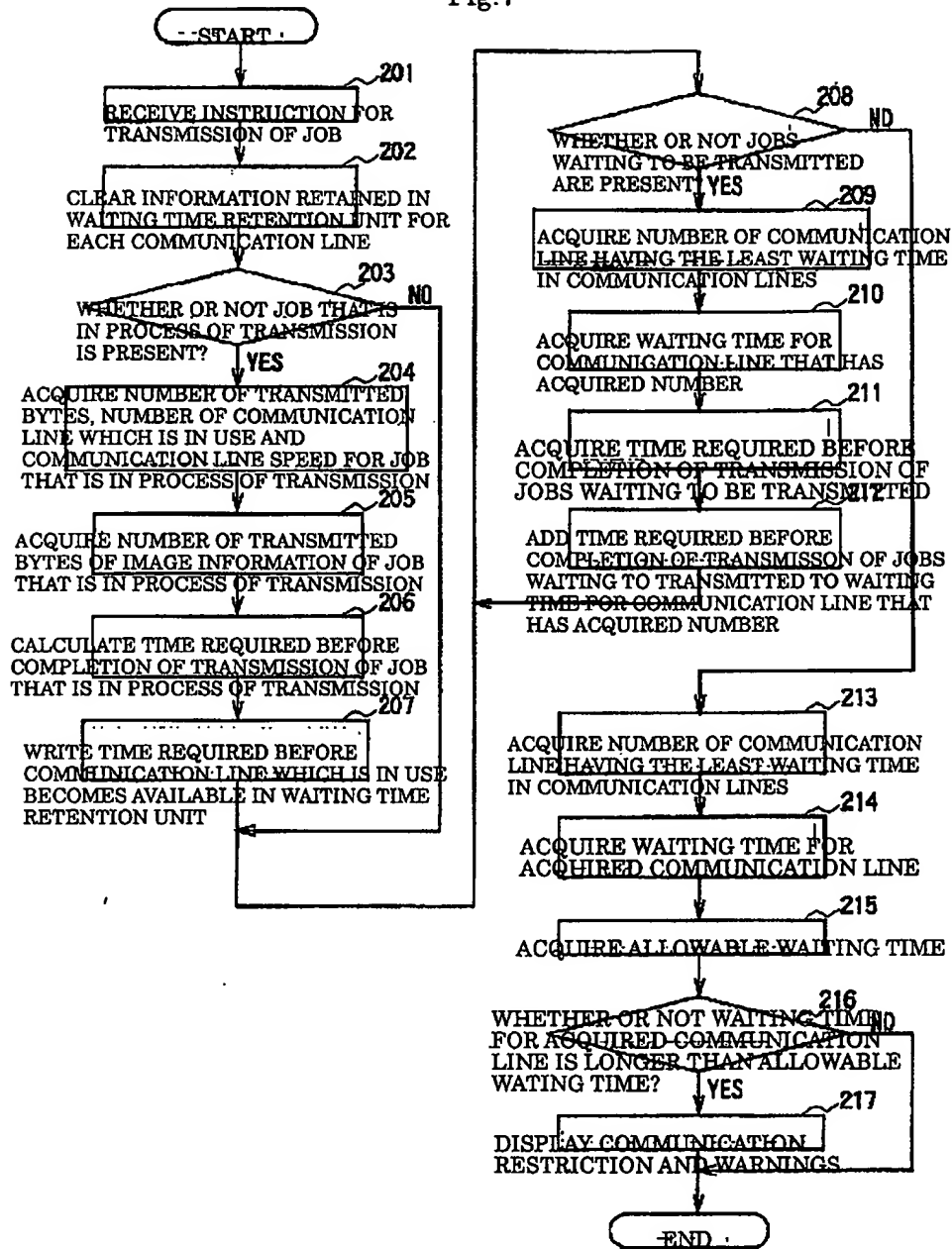
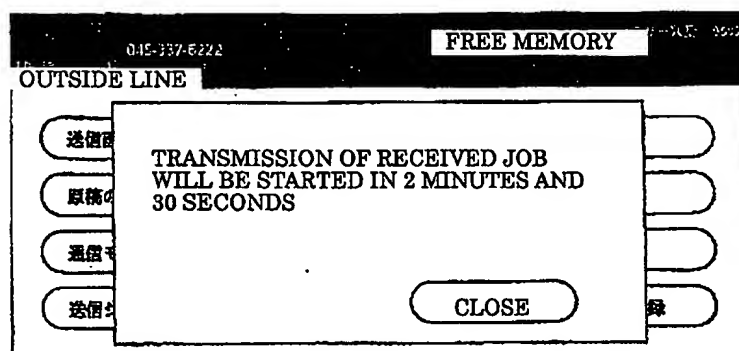


Fig.10



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FIG. 1

F	FACSIMILE DEVICE
C	CONTROL UNIT
1	IMAGE INPUT UNIT
2	INPUT RECEIVING UNIT
3	CLOCK MANAGEMENT UNIT
4	DISPLAY UNIT
5	JOB MANAGEMENT UNIT
6	MEMORY UNIT
7	COMMUNICATION CONTROL UNIT
8	JOB MANAGEMENT UNIT
	DISPLAY MANAGEMENT UNIT
8a	UPDATE UNIT
8b	WAITING TIME RETENTION UNIT
9	TIME CALCULATION UNIT
10	JOB STATUS MANAGEMENT TABLE
N	NETWORK

FIG. 2

DOCUMENT ID
ADDRESS NUMBER
ADDRESS
COMMUNICATION MODE
PAGE COUNT
BYTE COUNT
RECEIVED TIME
TIME REQUIRED
PRIORITY

FIG. 3

START

101 INSTRUCTION FOR JOB STATUS DISPLAY

102 CLEAR INFORMATION RETAINED IN WAITING TIME
RETENTION UNIT FOR EACH COMMUNICATION LINE

103 WHETHER OR NOT JOB THAT IS IN PROCESS OF
TRANSMISSION IS PRESENT?

104 ACQUIRE NUMBER OF TRANSMITTED BYTES, NUMBER OF
COMMUNICATION LINE WHICH IS IN USE AND COMMUNICATION
LINE SPEED FOR JOB THAT IS IN PROCESS OF TRANSMISSION

105 ACQUIRE NUMBER OF TRANSMITTED BYTES OF IMAGE
INFORMATION OF JOB THAT IS IN PROCESS OF TRANSMISSION

106 ACQUIRE CURRENT TIME

107 CALCULATE TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOB THAT IS IN PROCESS OF TRANSMISSION
AND TRANSMISSION COMPLETION TIME

108 DISPLAY TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOB THAT IS IN PROCESS OF TRANSMISSION
AND TRANSMISSION COMPLETION TIME

109 WRITE TIME REQUIRED BEFORE COMMUNICATION LINE
WHICH IS IN USE BECOMES AVAILABLE IN WAITING TIME
RETENTION UNIT

110 WHETHER OR NOT JOBS WAITING TO BE TRANSMITTED ARE
PRESENT?

111 ACQUIRE NUMBER OF COMMUNICATION LINE HAVING THE
LEAST WAITING TIME IN COMMUNICATION LINES

112 ACQUIRE WAITING TIME FOR COMMUNICATION LINE THAT
HAS ACQUIRED NUMBER

113 WHETHER OR NOT CURRENT TIME HAS BEEN ACQUIRED?

114 ACQUIRE CURRENT TIME

115 DISPLAY TIME AT WHICH TRANSMISSION OF JOBS WAITING

TO BE TRANSMITTED IS STARTED

116 ACQUIRE TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOBS WAITING TO BE TRANSMITTED

117 DISPLAY TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOBS WAITING TO BE TRANSMITTED

118 CALCULATE TIME AT WHICH TRANSMISSION OF JOBS
WAITING TO BE TRANSMITTED ENDS

119 DISPLAY TIME AT WHICH TRANSMISSION OF JOBS WAITING
TO BE TRANSMITTED ENDS

120 ADD TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOBS WAITING TO TRANSMITTED TO WAITING
TIME FOR COMMUNICATION LINE THTA HAS ACQUIRED NUMBER
END

FIG. 4

ATTRIBUTE INFORMATION

DOCUMENT ID

ADDRESS NUMBER

ADDRESS

COMMUNICATION MODE

PAGE COUNT

BYTE COUNT

RECEIVED TIME

TIME REQUIRED

PRIORITY

HIGH

MEDIUM

JOB STATUS MANAGEMENT TABLE

PROCESS ORDER

DOCUMENT ID

JOB STATUS

COUNT OF TRANSMITTED PAGE

COUNT OF TRANSMITTED BYTE

IN-USE COMMUNICATION LINE NUMBER

TRANSMITTING

WAITING

RECEIPT OF JOB

FIG. 5

COMMUNICATION STATUS

FREE MEMORY

ADDRESS

COMMUNICATION STATUS

COMMUNICAITON MODE

PAGE COUNT

TRANSMISSION START TIME

TIME REQUIRED

TRANSMISSION COMPLEITON TIME

FIG. 6

F2 FACSIMILE DEVICE

C CONTROL UNIT

1 IMAGE INPUT UNIT

2 INPUT RECEIVING UNIT

3 CLOCK MANAGEMENT UNIT

4 DISPLAY UNIT

5 JOB MANAGEMENT UNIT

6 MEMORY UNIT

7 COMMUNICATION CONTROL UNIT

8 JOB MANAGEMENT UNIT

DISPLAY MANAGEMENT UNIT
8a UPDATE UNIT
8b WAITING TIME RETENTION UNIT
8c JUDGMENT UNIT
9 TIME CALCULATION UNIT
10 JOB STATUS MANAGEMENT TABLE
N NETWORK

FIG. 7

START

201 RECEIVE INSTRUCTION FOR TRANSMISSION OF JOB
202 CLEAR INFORMATION RETAINED IN WAITING TIME
RETENTION UNIT FOR EACH COMMUNICATION LINE
203 WHETHER OR NOT JOB THAT IS IN PROCESS OF
TRANSMISSION IS PRESENT?
204 ACQUIRE NUMBER OF TRANSMITTED BYTES, NUMBER OF
COMMUNICATION LINE WHICH IS IN USE AND COMMUNICATION
LINE SPEED FOR JOB THAT IS IN PROCESS OF TRANSMISSION
205 ACQUIRE NUMBER OF TRANSMITTED BYTES OF IMAGE
INFORMATION OF JOB THAT IS IN PROCESS OF TRANSMISSION
206 CALCULATE TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOB THAT IS IN PROCESS OF TRANSMISSION
207 WRITE TIME REQUIRED BEFORE COMMUNICATION LINE
WHICH IS IN USE BECOMES AVAILABLE IN WAITING TIME
RETENTION UNIT
208 WHETHER OR NOT JOBS WAITING TO BE TRANSMITTED ARE
PRESENT?
209 ACQUIRE NUMBER OF COMMUNICATION LINE HAVING THE
LEAST WAITING TIME IN COMMUNICATION LINES
210 ACQUIRE WAITING TIME FOR COMMUNICATION LINE THAT

HAS ACQUIRED NUMBER

211 ACQUIRE TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOBS WAITING TO BE TRANSMITTED

212 ADD TIME REQUIRED BEFORE COMPLETION OF
TRANSMISSION OF JOBS WAITING TO TRANSMITTED TO WAITING
TIME FOR COMMUNICATION LINE THAT HAS ACQUIRED NUMBER

213 ACQUIRE NUMBER OF COMMUNICATION LINE HAVING THE
LEAST WAITING TIME IN COMMUNICATION LINES

214 ACQUIRE WAITING TIME FOR ACQUIRED COMMUNICATION
LINE

215 ACQUIRE ALLOWABLE WAITING TIME

216 WHETHER OR NOT WAITING TIME FOR ACQUIRED
COMMUNICATION LINE IS LONGER THAN ALLOWABLE WAITING
TIME?

217 DISPLAY COMMUNICATION RESTRICTION AND WARNINGS
END

FIG. 8

ALL LINES ARE BUSY NOW. TIME REQUIRED BEFORE INITIATION
OF COMMUNICATION EXCEEDS PRE-SET ALLOWABLE TIME.

DO YOU WANT TO ESTABLISH COMMUNICATION?

CONTINUE

CANCEL

FREE MEMORY

OUTSIDE LINE

FIG. 9

ALL LINES ARE BUSY NOW. TIME REQUIRED BEFORE INITIATION
OF COMMUNICATION EXCEEDS PRE-SET ALLOWABLE TIME.

NO JOB IS ACCEPTABLE

CLOSE

FREE MEMORY

OUTSIDE LINE

FIG. 10

TRANSMISSION OF RECEIVED JOB WILL BE STARTED IN 2
MINUTES AND 30 SECONDS

CLOSE

FREE MEMORY

OUTSIDE LINE

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